REMARKS

Claims 24 and 34 have been amended. Claim 35 has been cancelled. Claims 24-34 are pending. Applicants reserve the right to pursue the original and other claims in this and in other applications.

Claims 24-26, 28, 33 and 34 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,627,373 ("Keese"). Applicants respectfully traverse the rejection.

The present invention is directed to a charged particle beam apparatus. In particular, in the charged particle apparatus, a control device calculates, regarding at least two different alignment conditions, two dimensional deviations when a condition of the optical element is varied. In addition, the control device obtains a relational expression between the alignment condition and the two dimensional deviation based on each of the alignment conditions and each of the two dimensional deviations corresponding to the alignment conditions. Further, the control device calculates a signal supplied to the alignment defector based on the relational expression so that the two dimensional deviation becomes zero or nearly zero regardless of variation of an operation condition of the optical element. The recited limitations cover embodiments 1 and 2. Please note, however, that the scope of the claim is not to be limited to the disclosed embodiments. For more details, please refer to the specification, pages 8+.

Claim 24 recites a charged particle beam apparatus wherein the control device "calculates, regarding at least two different alignment conditions, two dimensional deviations" when a condition of the optical element is varied, obtains a "relational expression between the alignment condition and the two dimensional deviation" based on each of the alignment conditions and the two dimensional deviations corresponding to the alignment conditions, and calculates a signal based on the relational expression so that the two dimensional deviation becomes zero or nearly zero. This is an important feature of the invention. An advantage of the feature is that relational expression between the alignment condition and the two dimensional deviation is calculated and is not required to be stored in a table in advance. It is, therefore, possible to correct an image deviation accurately, easily and promptly even when a condition of an optical system changes over time. Moreover, fewer numbers of images are necessary compared to the conventional technique, such as the manual correction of the image deviation.

Keese, on the other hand, discloses varying a current value of an objective lens between extremes of a focal range in certain alignment in an iterative manner to stop varying the current value if an image deviation value becomes smaller than a predetermined threshold value. Keese, however, neither teaches or suggests obtaining a relational expression between an alignment condition and a two dimensional deviation based on each of alignment conditions and each of two dimensional deviations corresponding to the alignment conditions and calculating a signal supplied to an alignment defector based on the relational expression. Further, unlike the present invention, it is necessary to set up a threshold value in order to correct an image deviation in Keese. Further, it is unclear the threshold value that should be set up in Keese. Furthermore, although Keese suggests providing a signal such that an image deviation can be reduced, Keese is silent on what the signal is and how the signal is produced.

In this regard, the present invention provides calculating an alignment correction value based on a relational expression between an alignment condition and an image deviation. That is, it is not necessary to set up a threshold value for alignment correction.

In addition, in Keese, the repeat count of varying the current value depends on the precision of the alignment. In general, the alignment precision becomes stricter as the resolution required becomes higher and therefore, in Keese, it would take a long time to complete an alignment. As a result, throughput of a SEM is likely to deteriorate. In addition, a sample is likely to be damaged because an electron beam must continuously irradiate the sample while obtaining the images. For all of these reasons, claim 24 should be allowable over Keese.

Claims 25-31, 33 and 34 depend from claim 24 or contain similar limitations as claim 24. Therefore, claims 25-31, 33 and 34 should be likewise allowable.

Claims 32 and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Keese in view of U.S. Patent No. 6,067,164 ("Onoguchi"). Applicants respectfully traverse the rejection.

As mentioned earlier, Keese does not disclose or suggest all of the limitations of claim 24. The Office Action relies on Onoguchi as only discloses the additional limitations of claim 32. For at least these reasons, claim 32 should be allowable.

Further, Onoguchi only discloses setting up a function (Oi = G(Tx, Ty)) between an image deviation and an alignment, in advance. Onoguchi, however, is silent on how the function is determined. According to Onoguchi, it is not possible to actually correct an image deviation based on a calculation result using the function because the function G is varied depending on the condition of an optical system. As shown in the attached drawing, even if the function G is determined using Oi and (Tx, Ty), the function is varied due to temporal change of the condition of an optical system, for example from F to H. This volatility occurs because function between the image deviation and the alignment condition is generated using only one image deviation.

In the present invention, on the other hand, a relational expression corresponding to the function G is determined based on a plurality of alignment conditions and corresponding image deviations. So, even if the condition of an optical system is varied, it is possible to align an optical axis of a beam every time the condition of the optical system is varied. In particular, though the condition of the optical system of an electron microscope is often varied over time, it is possible to cope with such a problem according to the present invention. For these additional reasons, claim 32 should be allowable over the cited references.

Claim 35 has been cancelled and therefore, the rejection is moot.

A notice of allowance is respectfully solicited.

Dated: April 28, 2008

Respectfully submitted,

By____________________

Mark J. Thronson
Registration No.: 33,082
Ranga Sourirajan
Registration No.: 60,109
DICKSTEIN SHAPIRO LLP
1825 Eye Street, NW
Washington, DC 20006-5403
(202) 420-2200
Attorneys for Applicants